

BMP-20

BMP: ROCK CHECK DAMS

Definition

Small temporary stone dams constructed across a swale or drainage ditch.

Purpose

To reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale or ditch. This practice also traps sediment generated from adjacent areas or the ditch itself, mainly by ponding of the stormwater runoff. Field experience has shown it to perform more effectively than silt fences or straw bales in the effort to stabilize "wet-weather" ditches.

Conditions Where Practice Applies

This practice, utilizing a combination of stone sizes, is limited to use in small open channels which drain 4 hectares (10 acres) or less. It should not be used in a live stream as the objective should be to protect the live watercourse. Some specific applications include:

1. Temporary ditches or swales which, because of their short length of service, cannot receive a non-erodible lining but still need protection to reduce erosion.
2. Permanent ditches or swales which, for some reason, cannot receive a permanent non-erodible lining for an extended period of time.
3. Either temporary or permanent ditches or swales which need protection during the establishment of grass linings.
4. An aid in the sediment trapping strategy for a construction site. This practice is not a substitute for major perimeter trapping measures such as a SEDIMENT TRAP (BMP-13) or a SEDIMENT BASIN (BMP-14).

Planning Considerations

Check dams are effective in reducing flow velocity and thereby the potential for channel erosion. It is usually better to establish a protective vegetative lining before flow is confined or to install a structural channel lining than to install check dams. However, under circumstances where this is not feasible, check dams are useful.

Check dams installed in grass-lined channels may kill the vegetative lining if submergence after rains is too long and/or silting is excessive.

If check dams are used in grass-lined channels which will be mowed, care should be taken to remove all the stone when the dam is removed. This should include any stone which has washed downstream.

As previously mentioned, they have been found to be an effective aid in trapping sediment particles by virtue of their ability to pond runoff.

Specifications

No formal design is required for a check dam; however, the following criteria should be adhered to when specifying check dams:

1. The drainage area of the ditch or swale being protected shall not exceed 8,000 square meters (2 acres) when coarse aggregate is used alone and shall not exceed 40,500 square meters (10 acres) when a combination of Class I Riprap (added for stability) and coarse aggregate is used. Refer to Figure 20-1 for orientation of stone and a cross-sectional view of the measure. An effort should be made to extend the stone to the top of channel banks.
2. The maximum height of the dam shall be 1 meter (3 feet).
3. The center of the check dam must be at least 150 millimeters (6 inches) lower than the outer edges. Field experience has shown that many dams are not constructed to promote this "weir" effect. Stormwater flows are then forced to the stone-soil interface, thereby promoting scour at that point and subsequent failure of the structure to perform its intended function.
4. For added stability, the base of the check dam can be keyed into the soil approximately 150 millimeters (6 inches).
5. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

6. Stone should be placed according to the configuration in Figure 20-1. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to insure that the center of the dam is lower than the edges.
7. Filter cloth may be used under the stone to provide a stable foundation and to facilitate the removal of the stone. See BMP-19, RIPRAP, for required physical properties of the filter cloth.

Sediment Removal

Sediment should be removed from behind the check dams when it has accumulated to one half of the original height of the dam.

Removal of Practice

Unless they will be incorporated into a permanent stormwater management control, check dams must be removed when their useful life has been completed. In temporary ditches and swales, check dams should be removed and the ditch filled in when they are no longer needed. In permanent structures, check dams should be removed when a permanent lining can be installed. In the case of grass-lined ditches, check dams should be removed when the grass has matured sufficiently to protect the ditch or swale. The area beneath the check dams should be seeded and mulched immediately after they are removed. The use of filter cloth underneath the stone will make the removal of the stone easier.

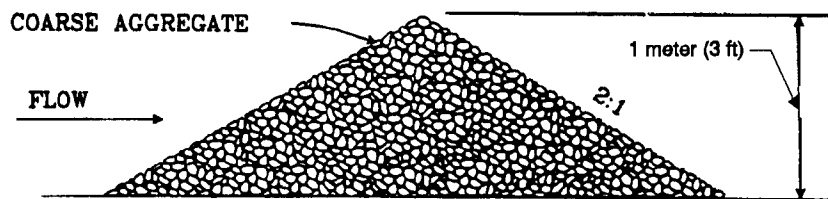
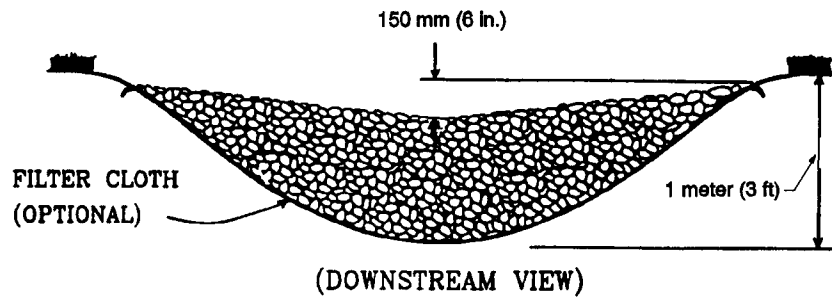
Maintenance

Check dams should be checked for sediment accumulation after each runoff-producing storm event. Sediment should be removed when it reaches one half of the original height of the measure.

Regular inspections should be made to insure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam should be corrected immediately.

FIGURE 20-1: ROCK CHECK DAM

8,000 SQUARE METERS (2 ACRES) OR LESS OF DRAINAGE AREA:



8,000 - 40,500 SQUARE METERS OR LESS
OF DRAINAGE AREA (2-10 ACRES)

